Citizens Observatories
The CITI-SENSE project and sensor platforms

IoT week, London
Session: Mobile citizen/personal sensors and crowd sourcing
Tuesday June 17th, 2014

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SINTEF

NILU

European Commission

CITI-SENSE

Program

- *Moderators: Arne J. Berre, SINTEF and Boris Pokrić, DunavNET*
- **11:30: Citizens Observatories - The CITI-SENSE project and sensor platforms**
- *Presenter: Arne Berre*
- *Organization: SINTEF*
- **11:45: COBWEB – Citizen Observatory WEB**
- *Presenter: Jamie Williams*
- *Organization: Environment Systems*
- **12:00: WeSenseIt – Citizen Water Observatories**
- *Presenter:* Suvodeep Mazumdar
- *Organization: University of Sheffield*
- **12:15: CLIPS and IoT Lab – Public Administration and Crowdsourcing**
- *Presenter: Srdjan Krčo*
- *Organization: DunavNET*
- **12:30: MobiWallet – Personal Devices in Smart Transport**
- *Presenter: Boris Pokrić*
- *Organization: DunavNET*
- **12:45: Mobile sensors and Crowdsourcing – solutions and challenges**
- *Discussion with presenters and audience*

The five Citizen Observatory projects are funded by the EU as part of the topic ENV.2012.6.5-1 "Developing community based environmental monitoring and information systems using innovative and novel earth observation applications."

CITI-SENSE

- **Development of sensor-based Citizens' Observatory Community for improving quality of life in cities**

- **Citizens' observatories** – *communities that share technological solutions, information products and services and community participatory methods. Complementing established environmental data and information systems, improving local environmental decision making.*

- Nine cities (Barcelona, Belgrade, Edinburgh, Haifa, Ljubljana, Oslo, Ostrava, Vienna, Vitoria) use sensors to gather data on outdoor urban spaces and indoor school environments.

Basic data

Starting date: 01/10/2012

Duration: 48 months

Budget:12M€

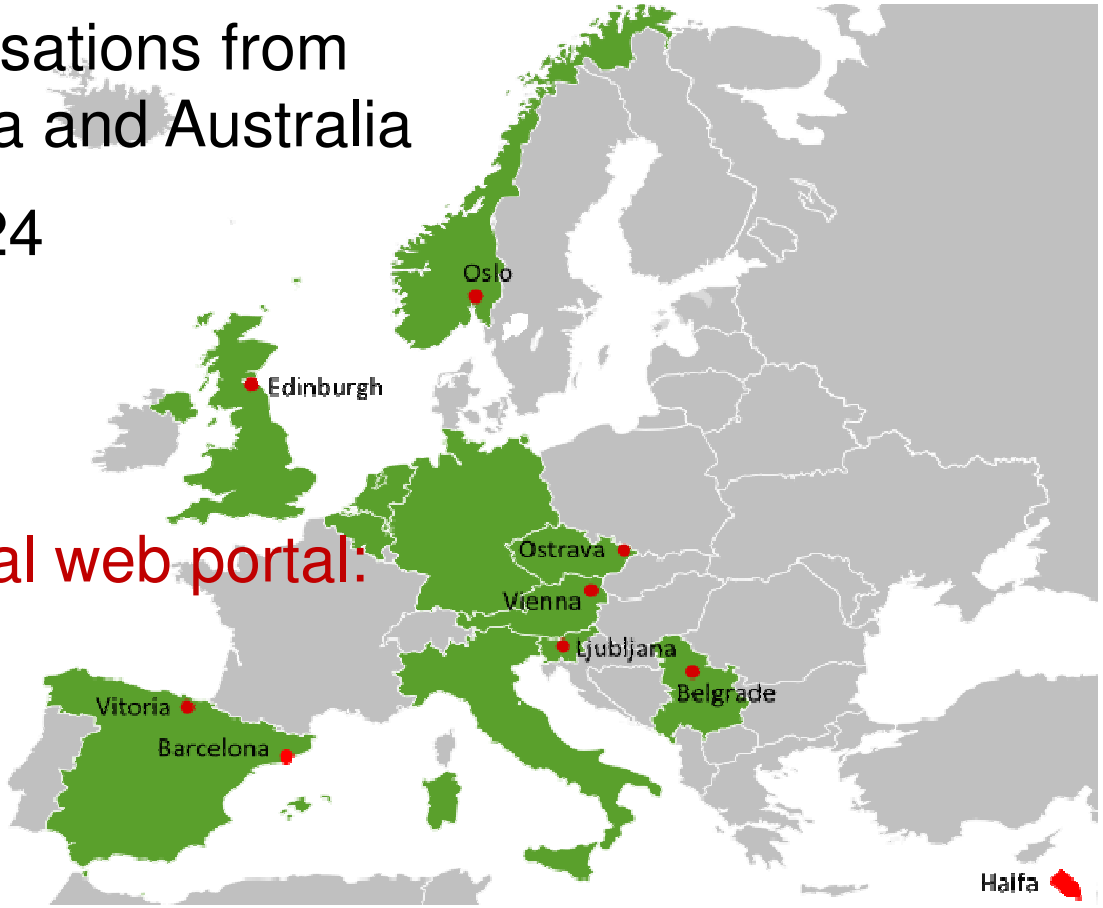
Partners: 28 partner organisations from Europe, Israel, South Korea and Australia

Grant agreement nº: 308524

Project web portal:

http://www.citi-sense.eu

Citizens' observatory central web portal:
http://co.citi-sense.eu

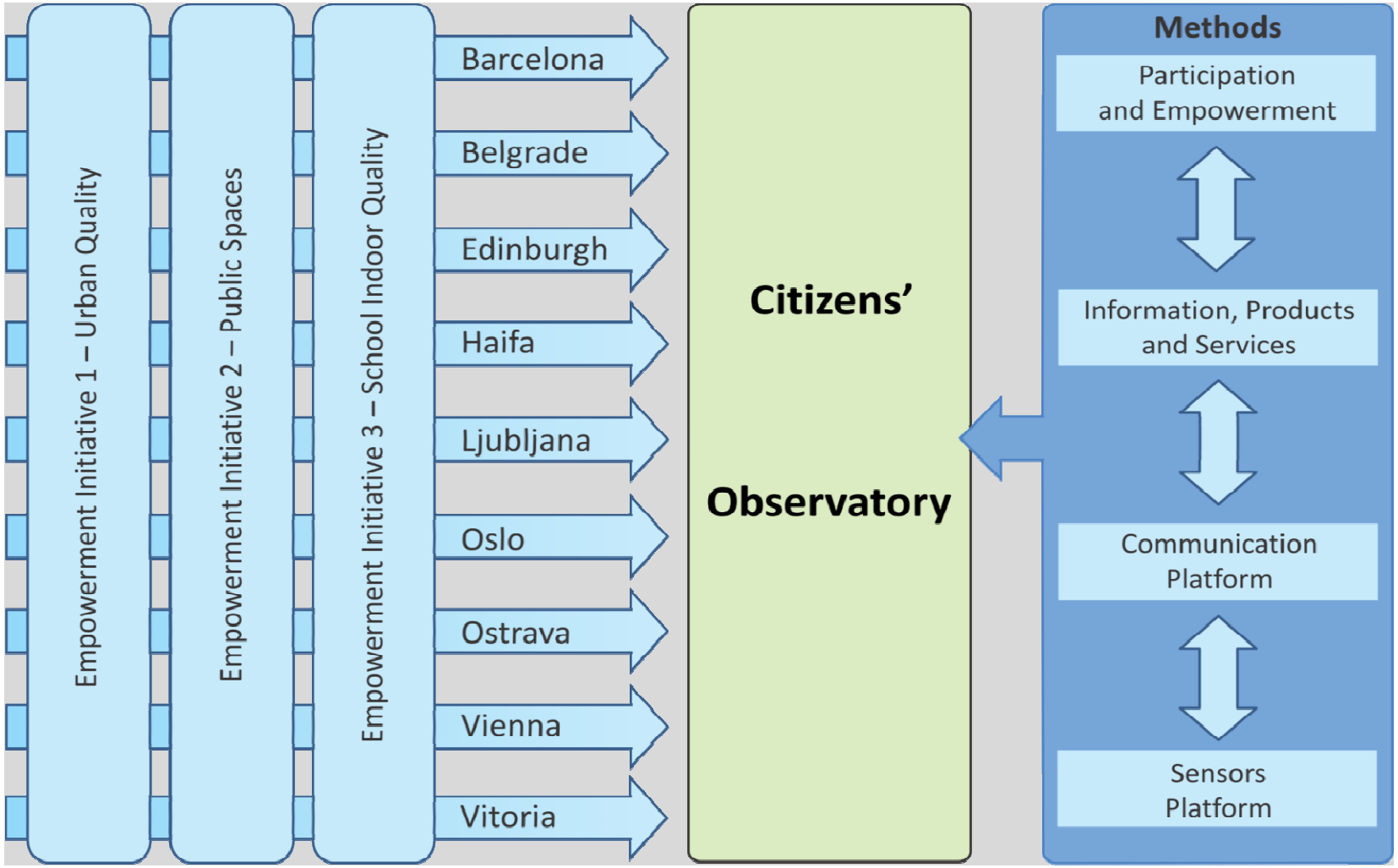


CITI-SENSE partners

Partners:

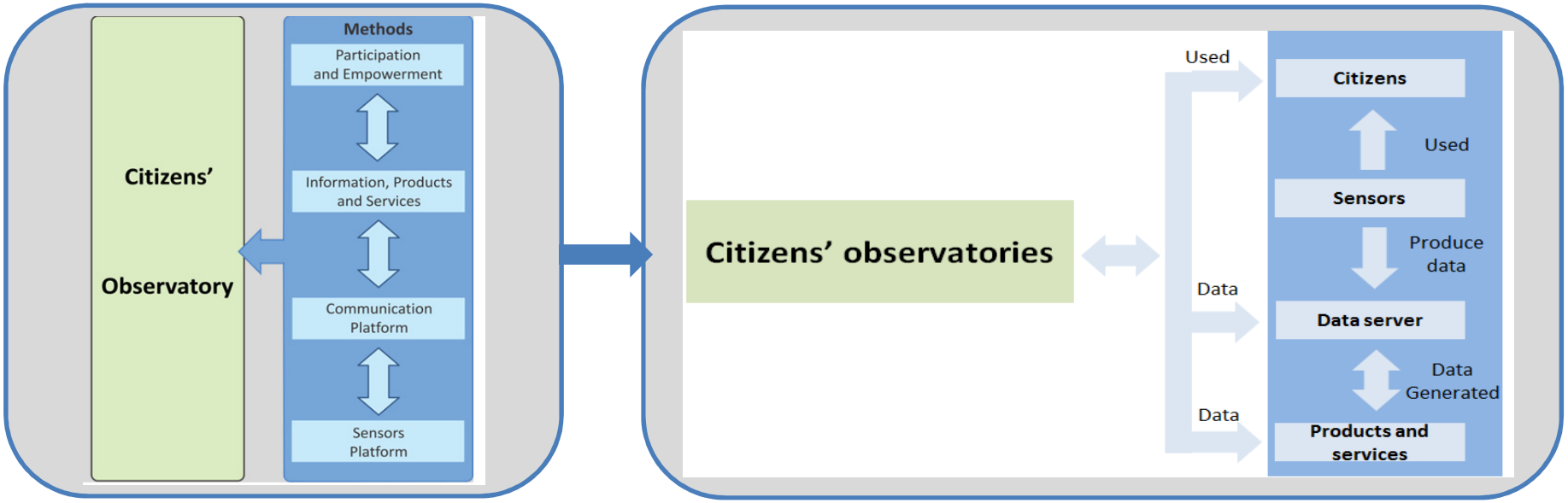
CITI-SENSE is a four year Collaborative Project partly funded by the EU FP7-ENV-2012 under grant agreement 308524, started in October 2012.

CITI-SENSE Citizens' Observatory

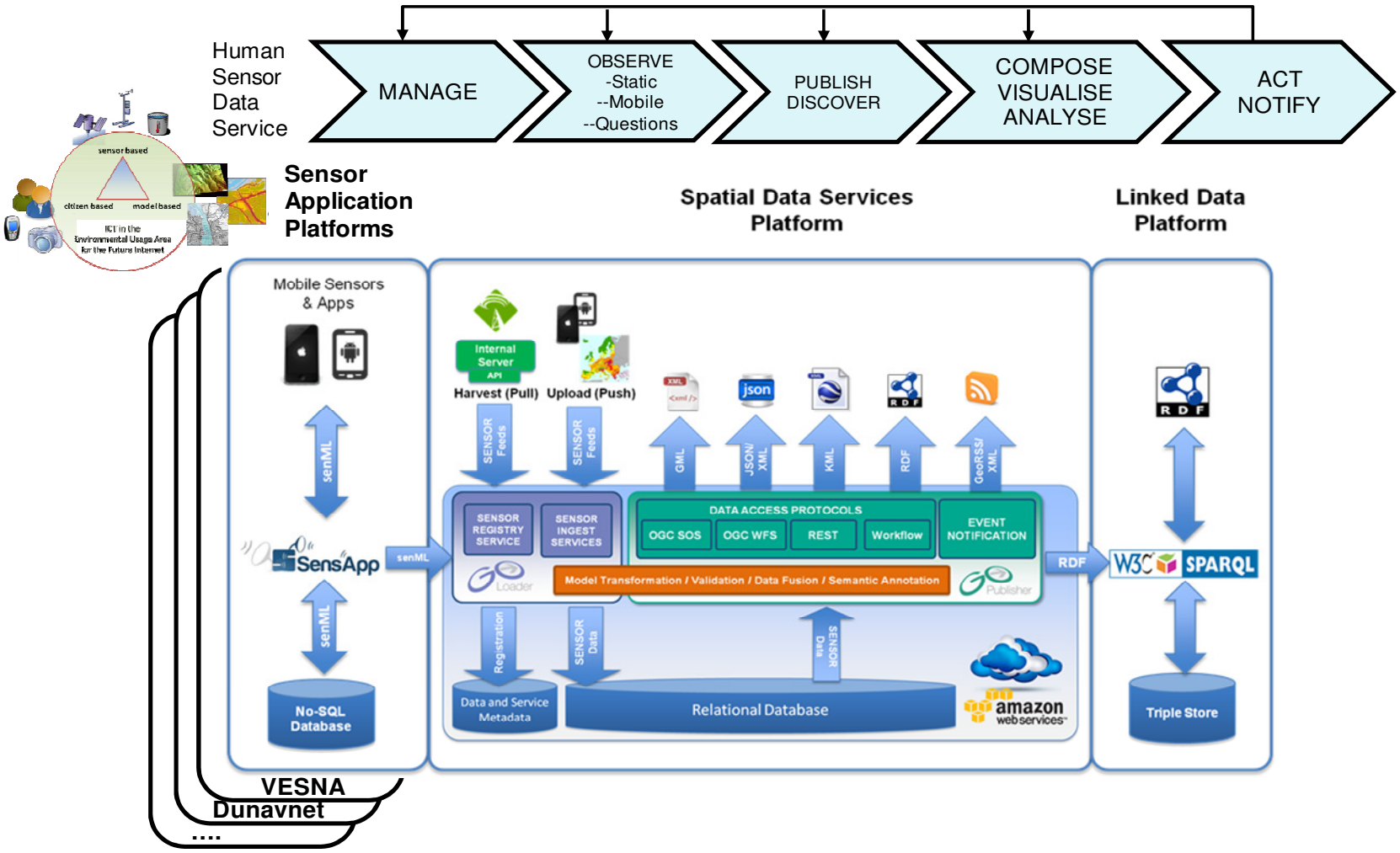


Citizens' Observatories Information Chain

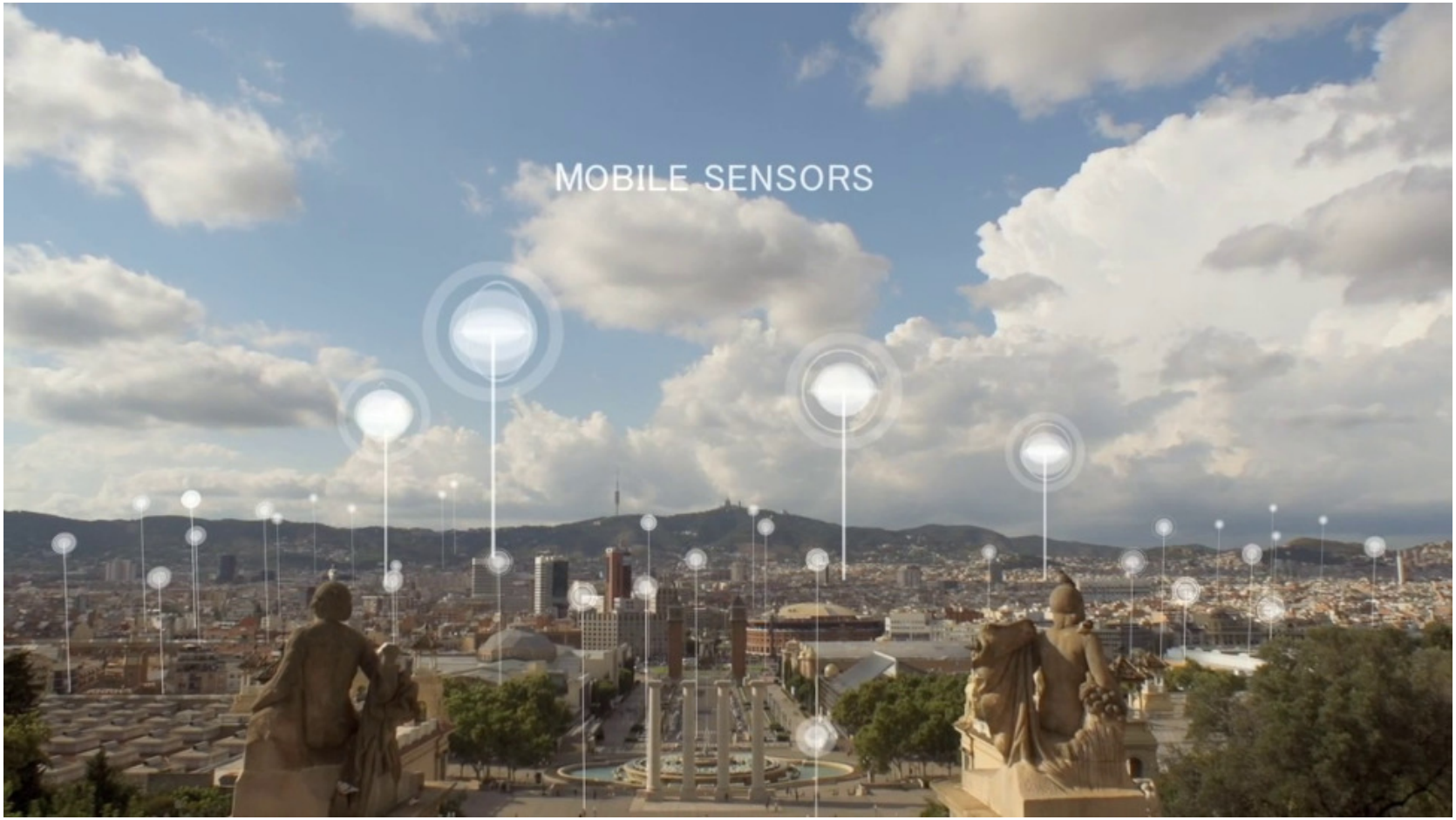
- **Four pillars of the COs information chain**
  - ❖ Citizens: citizens involvement in both monitoring through sensors and products and services using
  - ❖ Sensors: technologies for distributed monitoring
  - ❖ Data storage: information and communication technologies
  - ❖ Services and products



CITI-SENSE Platform

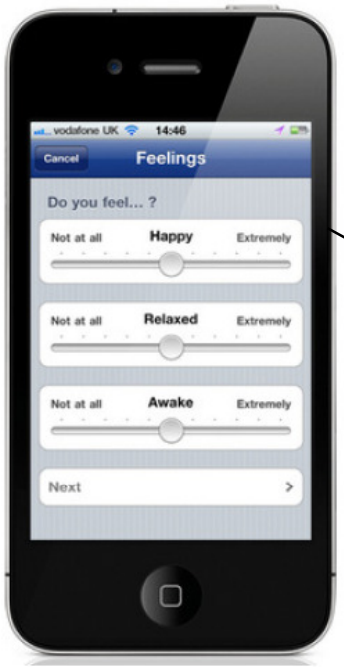


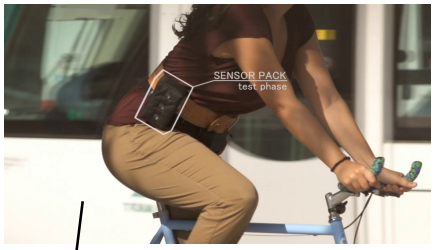
CITI-SENSE | Mobile Sensors



Ref. later presentation “Sensor Platforms for Citizens Observatories”, Leonardo Santiago, ATEKNEA

Mobile sensors





User off-site

User requests to server

User Mobile

Sensors, questionnarie and GPS data can be stored locally on user's phone.
Uploaded periodically.
Evaluation of the measurements is provided on-site

ACOUSTIC sensor | PHOTOGRAPH camera | QUESTIONNARIE data

On-site / Personal estimations of UV, THERMALCOMFORT, ACOUSTICS exposure

2-way info. flow

Application Server

Visualisation
Notification service
Schedule service data state

Data transmission via BLUETOOTH

User THERMAL COMFORT sensor

User UV sensor

Centralised data Storage

User profile, location/coordinates sensor data, questionnaries, additional DDBB/information for EI, results/calculations

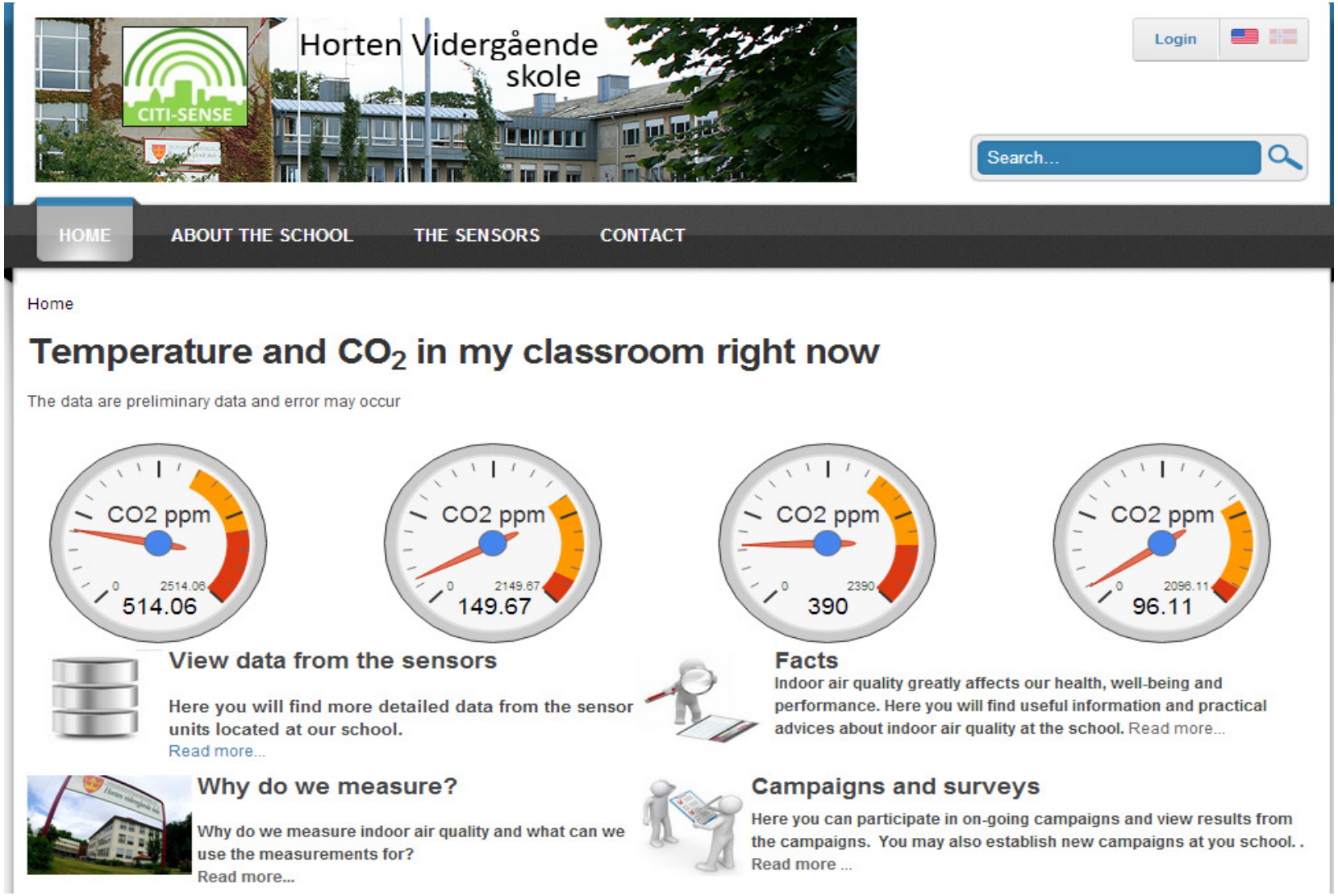
Ambient UV, CLIMATE, ACOUSTIC

Background data from static stations

Processing server

Data is processed/modelled
Schedule service data state

In situ sensors

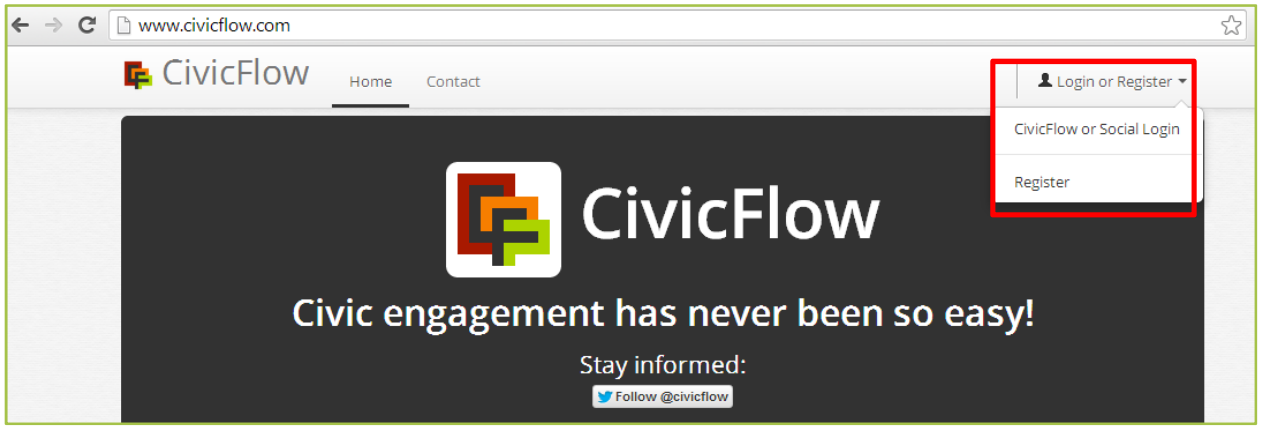


Create mobile/web questionnaires with CivicFlow

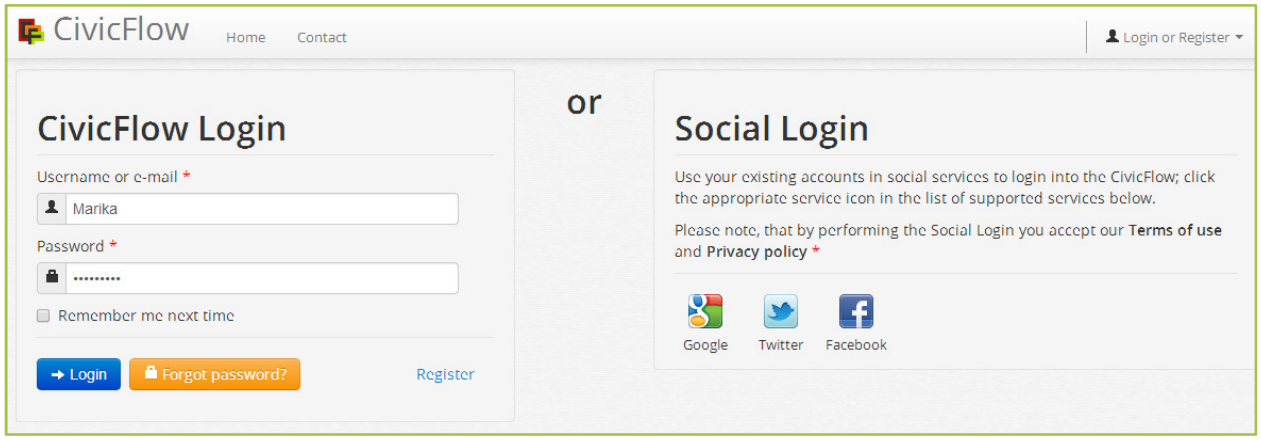
Go to www.civicflow.com and choose "CivicFlow or Social Login" or choose "Register" if you want or need to create a new account.

Registering as a user is uncomplicated and takes a minute or two.

If you choose "Social Login", you can log in with your Google, Twitter or Facebook account. This means CivicFlow will access your social profile information.

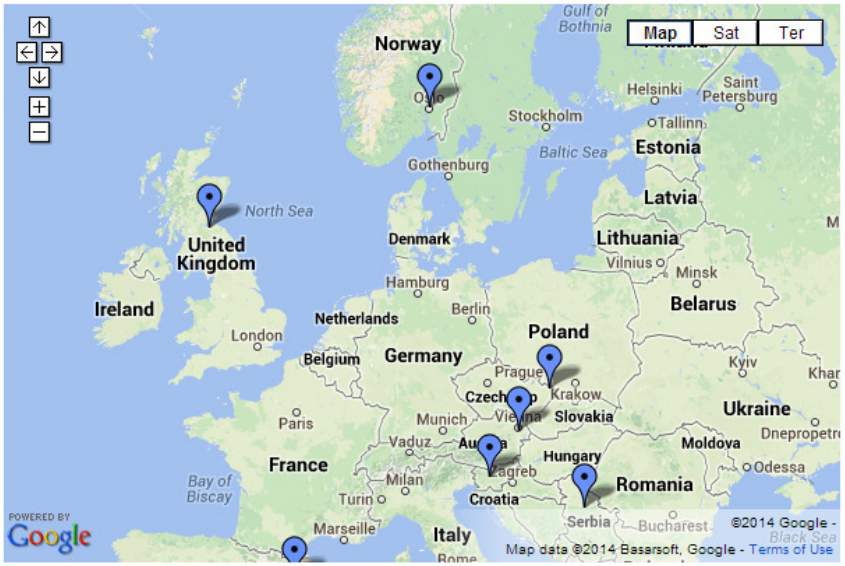


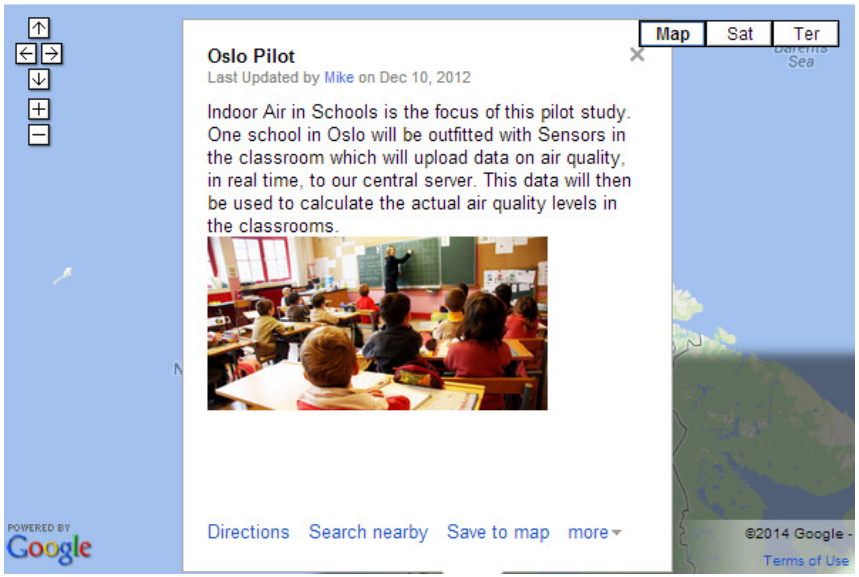
In the screenshot to the right, I choose to log in as a registered user.

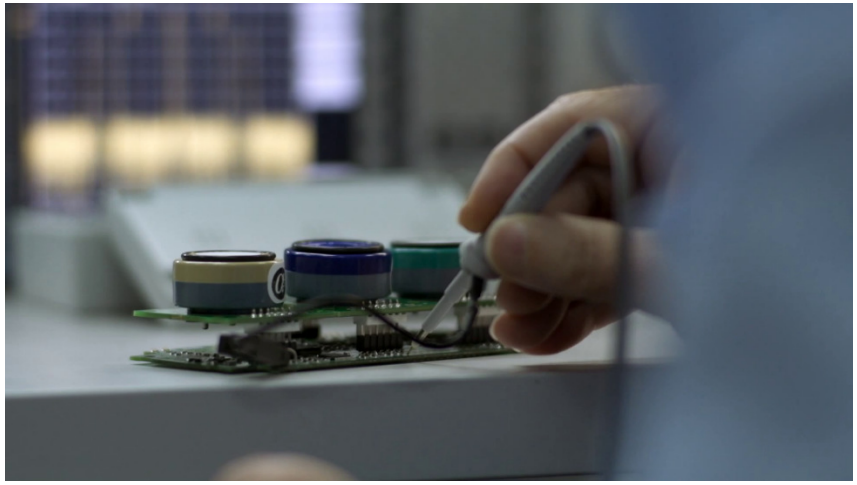


Citizens' Observatories Web Portals

See IoT Week Session , Wednesday, Butler User experiences – Crowd sourcing







Deliver highly portable “mobile” sensor solutions based on the use of a sensor “accessory” and smartphone internal sensors and connectivity

This project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no 308524

CITI-SENSE | Sensor Suppliers

Alphasense

CO, NO, NO_2, O_3, CO_2, $PM_{2.5}$

Dylos, Sharp

light scattering(almost $PM_{2.5}$)

SGX, Figaro

MO: NO_2, O_3

Obeo

Radon

Sensirion, Honeywell

Noise, T, RH,

Vitoria WP2

RH, T, Airflow, Noise, Direct Radiation, UV

Testo

CO_2

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CITI-SENSE | Sensor Platform Providers

Platform suppliers

Fixed sites

Geotech

Airbase

CVUT

Obeo

DNet

Mobile

Ateknea

JSI

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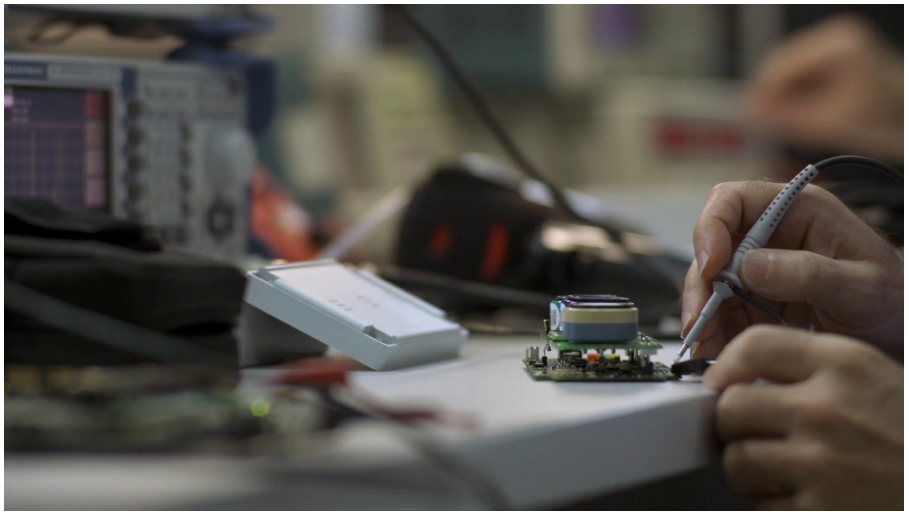
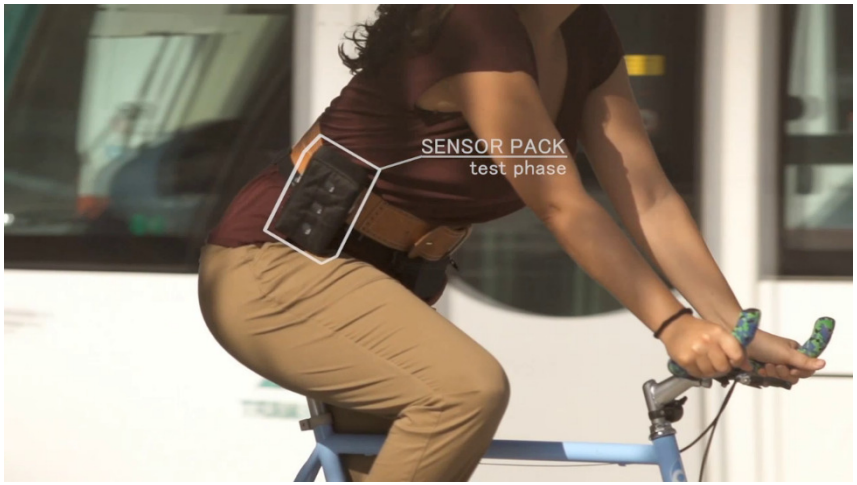
CITI-SENSE | Personal Sensor Pack

ATEKNEA Sensor Pack in Pouch	
Total Weight (in pouch)	270 g approx.
Dimensions (in pouch)	85 x 135 x 60 mm (length x width x depth) The velcro strap adds 15 mm to the depth
Box Material	ABS
Pouch Material	Interior: cotton canvas fabric Exterior: polyester canvas fabric





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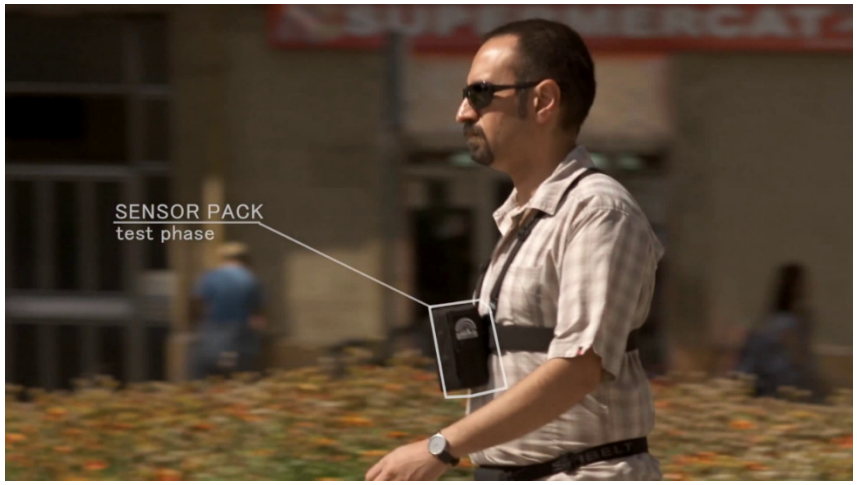
CITI-SENSE | Personal Sensor Pack

The Personal Sensor Pack developed by Ateknea is equipped with the following sensors:

- NO_2, O_3, CO (ppb)
- Temperature (°C) (Sensiron SHT75)
- Relative Humidity (%) (Sensiron SHT75)

- USB connectivity
- Bluetooth 2.0



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Personal Sensor Pack | Further Work

- Migrate from Bluetooth 2.0 to Bluetooth 4.0 (Bluetooth Smart)
- Migrate from Alphasense B4 sensors to more compact Alphasense A4 sensors.
- Integrate noise sensing (to be defined)
- Develop a smaller form factor for the sensor pack.

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GEOSS/INSPIRE/Member State Common Infrastructures

Registries

- Components & Services
- Standards & Interoperability
- Best Practices
- User Requirements
- Vocabularies

- GEO Portals
- Discovery Service
- Discovery & View Application
- Metadata editor
- GEOSS Clearinghouse

CITI-SENSE Observatory

Citizen Participation | **User Empowerment Social media** | **Protocol for Citizen Empowerment**

Web Apps, Mobile Apps, GEO-PORTALS, REPORTING

CITI-SENSE Products and Services

Business Process Tier

Registers: Ontologies App Schemas .....

User & Rights Management

Workflow Management & Orchestration (Service Chaining)

- Uncertainty Handling & Provenance
- Semantic Annotation, Mediation & Discovery
- Data Composition & Fusion Services
- Visualisation & Portrayal Services
- Model Transformation & Model-as-a Service

Sensor Platform Tier

Smart Phone Mobile Sensors

Mobile Devices, Apps, VGI

Bluetooth Low Energy (BLE)

In situ/Mobile Sensors

Wi-Fi

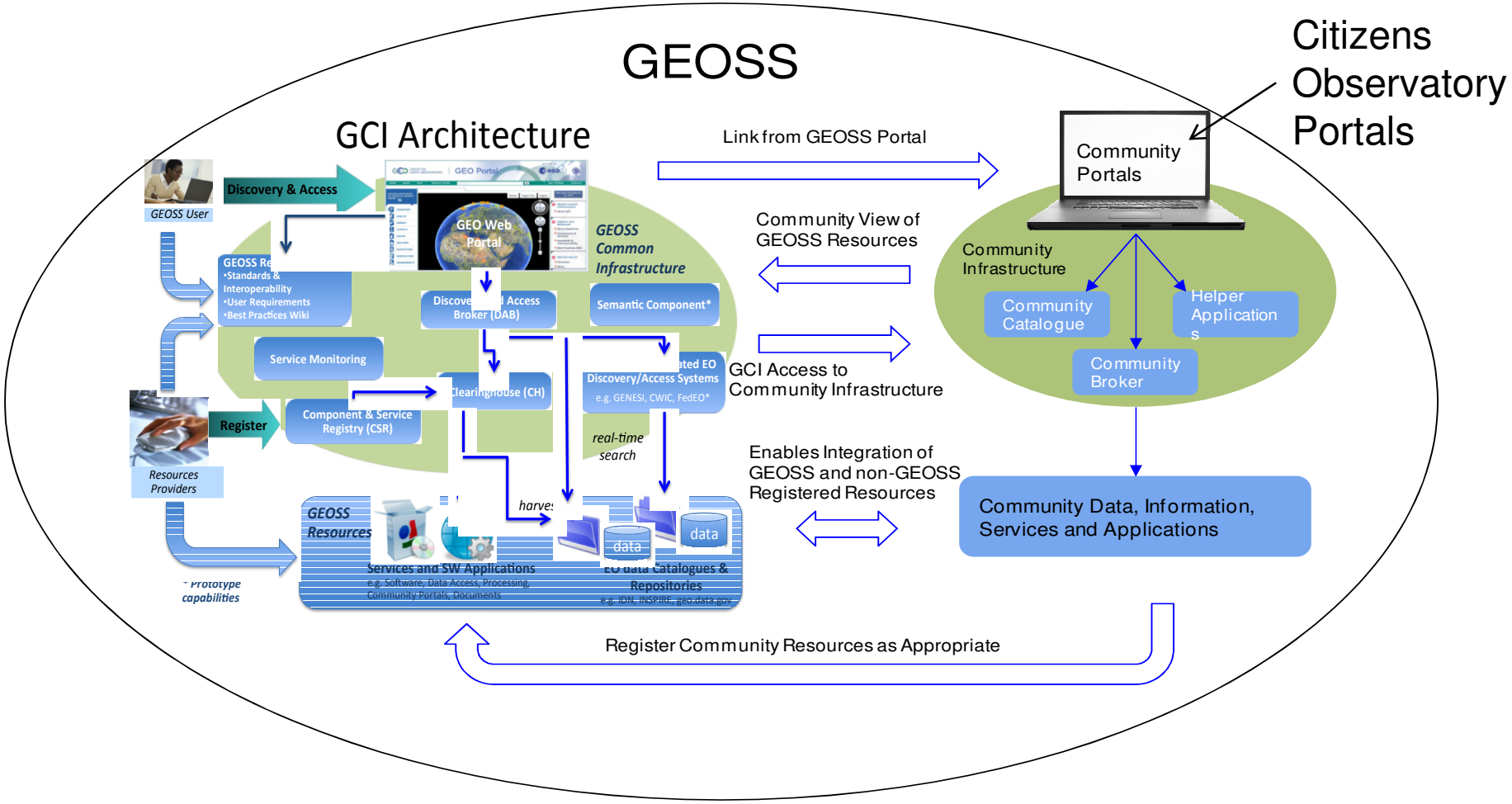
Intelligent Gateways

Adaptive Sensors (ThingML, Contiki, TinyOS, ...)

Data Access Tier

- **OGC Web Services** (WFS, WCS, SOS)
- **Event Services** (WS-N, SAS, SES)
- **Linked Data Services**
- **Download Services**

GEOSS and Community portals



Thank you for your attention!

- **Find us on**

- CITI-SENSE CO's central web portal: http://co.citi-sense.eu
- Common CO project's web site: http://www.citizen-obs.eu/

- LinkedIn: https://www.linkedin.com/groups/Citizens-observatories-5164755
- Facebook: https://www.facebook.com/int.cit.obs
- Twitter: https://twitter.com/Citizensobs
- Email: Arne.J.Berre@sintef.no

- CITI-SENSE web site: http://citi-sense.nilu.no/